

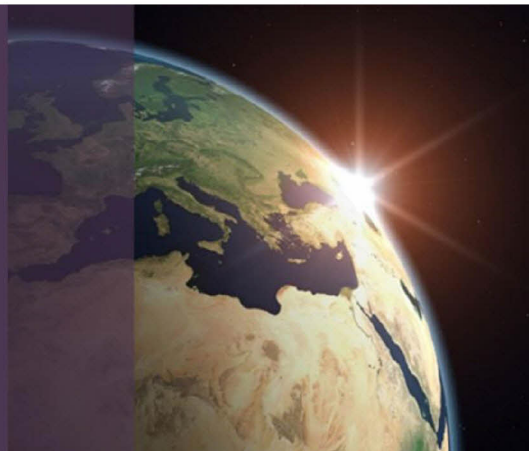


Safety Topic of the Month

2008 Major Incident Study

Richmond Refinery

July 2009



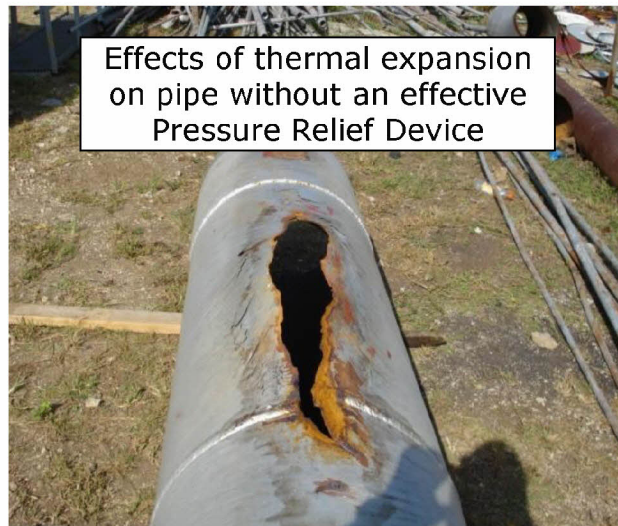
Introduction



The 2008 Major Incident Study (MIS) reviews incidents and major near misses that occurred from October 2007 (the end of the 2007 study) through September 2008.

The incidents reviewed cover Chevron's global operations across Upstream as well as Downstream.

2008 Major Incident Study is available at [Link](#)



Overall Findings

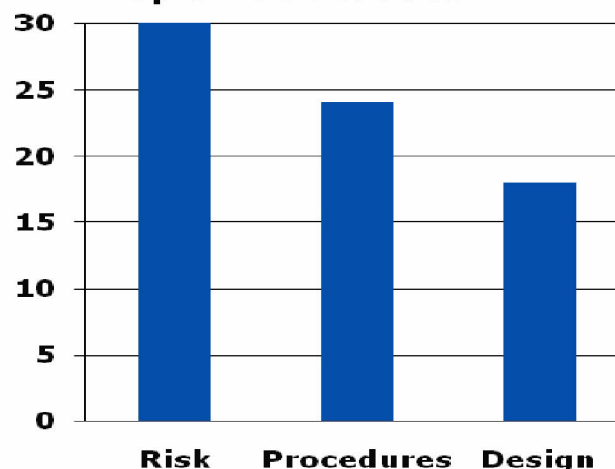
The top root causes of major incidents included in this study were

- Risk Recognition
- Procedures
- Design

This is consistent with findings in previous studies

EVERY Global Downstream incident in this year's study identified Procedures / Safe Work Practices (SWP) **or** Risk Recognition as a root cause

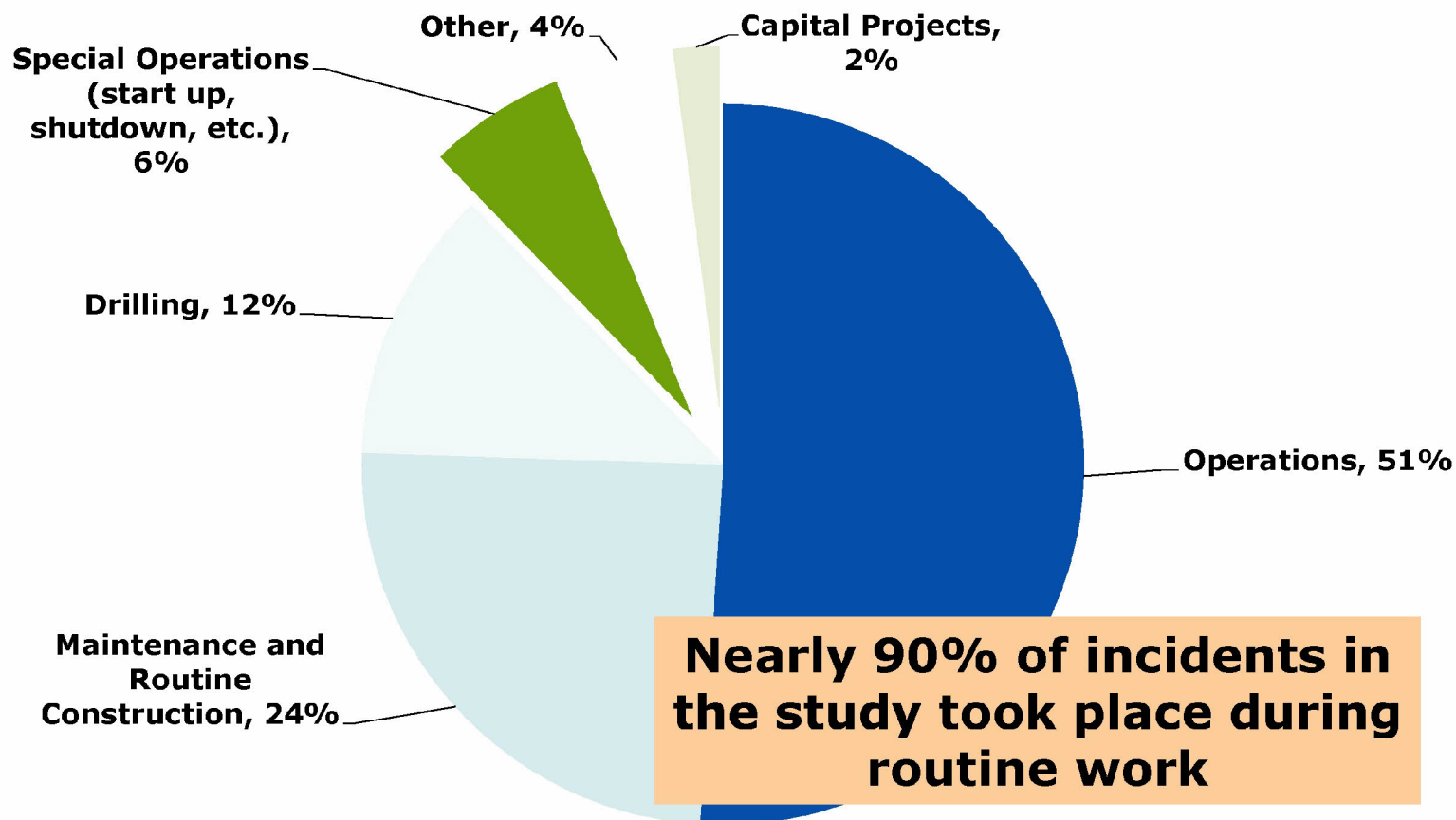
Top 3 Root Causes



The Major Incident Study uses 18 root cause categories. As well as the 3 listed above, other root cause categories include:

- Management of Change
- Supervision
- Training / Competency
- Inspection / Quality Control
- Preventive Maintenance
- Communications

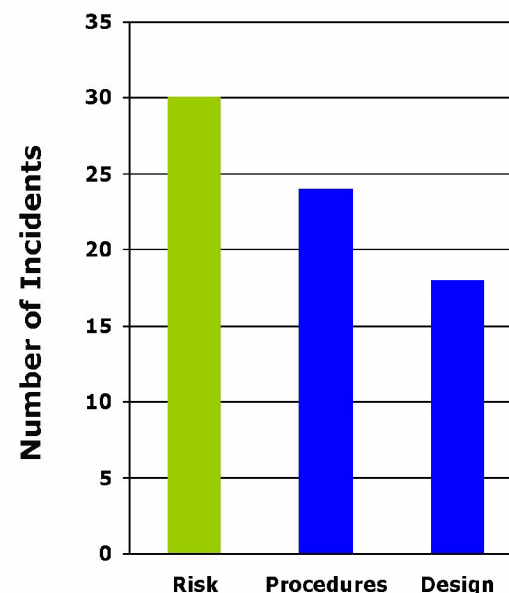
Routine Work



Risk Recognition

Nearly all 30 incidents that identified risk recognition as a root cause involved one or more safeguards failing. The incident consequences could have been prevented or reduced with:

- Additional safeguards
- Better maintained safeguards
 - Dropped load from a crane where there was inadequate maintenance & actions based on load testing
- Individual risk recognition and mitigation
 - Placing one's body in line of fire for moving loads
 - Work involving metal poles close to electrical power lines



Some tools we use to manage risks include:

- ▶ *LPSA before each task or when it changes*
- ▶ *Job Hazard Analysis when planning work*
- ▶ *Health & Safety Evaluations (HSE) as part of every MOC*
- ▶ *PHAs and other evaluation tools*

New tools coming:

- ▶ *Supporting Operational Discipline*

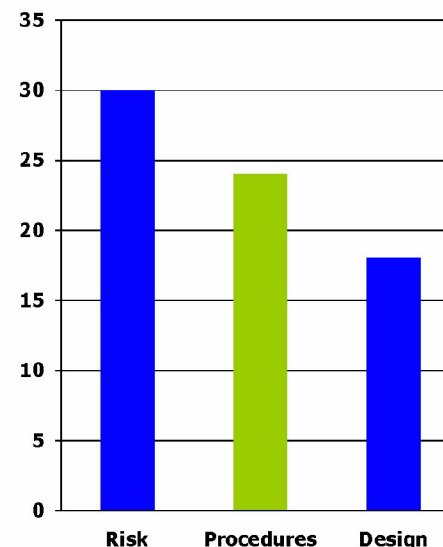
Following Procedures

Included formal, written process related procedures (e.g. start-up and shut-down plus job skills such as erecting scaffolding, rigging loads and using testing devices.
Example: basic lockout/tag out principles were not followed in several incidents.

Do we have barriers that might prevent someone from using the right procedure or Safe Work Practice?

Did You Know?

Over 80% of Global Manufacturing incidents included in 2008 MIS involved Procedures / Safe Work Practices as a root cause.



Some tools we use to ensure we follow procedures include:

- ▶ *Signing off on each step of critical procedures*
- ▶ *Ensuring procedures are up to date and accurate (annual procedure review)*
- ▶ *Audits of critical procedures (e.g. Safe Work Practices)*
- ▶ *Tenet 4*

New tools coming:

- ▶ *Supporting Operational Discipline*

Operational Discipline



Everyone carries out every task, the right way, every time

- We recognize the risks and plan to eliminate them

Some indicators we're doing things right are when:

- Hazard recognition abilities are displayed and outcomes acted upon
- Following procedures is the only accepted behavior
- We conduct all work without tenet violations
- Everyone feels able to exercise stop work authority when necessary
- We follow our management of change process before deviating from procedures
- Consequences of following/not following processes and procedures are understood and respected

**More information on Global Manufacturing
Operational Discipline initiatives coming later this year**

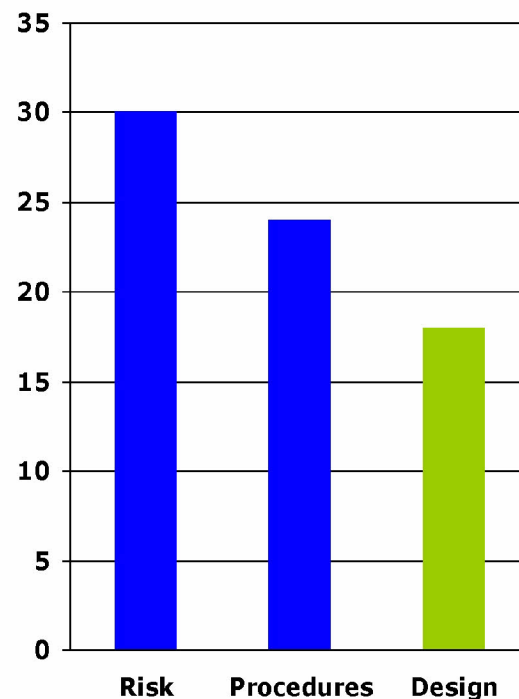
Design



Design was a significant root cause for over 35% of the incidents studied. Decisions in the design and construction process contributed to over half of these.

In the remaining incidents, design was considered a contributing factor, but not the primary cause of the incident. 15 of 18 Design incidents were reliability incidents.

Risk assessment and procedures can also play a role in 'Design' incidents. The design process includes an assessment of risk and then following appropriate design procedures to mitigate that risk.



Some tools we use to ensure safety in design:

- ▶ *Involving the right people in MOC reviews*
- ▶ *O&M reviews of Capital Projects*
- ▶ *CPDEP tools*
- ▶ *Inherently Safer Systems approach to design*

Discussion Example

Work to replace a butterfly valve on a tank required breaking several flanges.

Flammable vapors leaked from a flange on top of the tank and were ignited by a truck that was next to the tank.



The JHA did not address the potential release of flammable vapors and the sequence of work was not planned to avoid this risk.

The Standard Operating Procedure for bringing vehicles inside the tank containment area was not followed.

Could something similar happen here?

Risk Recognition

- Discuss where we are at risk
- What can we do about the risks we've identified?

Procedures and Safe Work Practices

- Are there procedures we don't follow?
 - Why not?
 - Do we know all the requirements in those procedures?

Design and MOC / Reliability

- What is our role in this area?

Risk Recognition

- Conduct an LPSA / Job Hazard Analysis before any job
 - Ensure hazards have been properly identified
 - Act on the findings before beginning work
- Ensure endorsed deviations from a plan appropriately address the risks

Procedures & Safe Work Practices

- Ensure appropriate procedures are: available; complete; accurate and understood
 - When updates are needed, provide feedback to the procedure or SWP owner
- Understand our role in any procedure or SWP
- Do every task, the right way, every time

Design and MOC / Reliability

- Ensure there is adequate review of designs including assessment of wide range of operating and environmental conditions
- Use our MOC process appropriately for all changes
- Follow our risk based maintenance and inspection program including the URIP process

Continuing from Last Year...



After last year's MIS, the Refinery Leadership Team put together four focus groups to identify opportunities to reduce potential risks. The opportunities identified were prioritized. This work will continue into 2010. The priorities were:

Procedures and Operational Discipline

- Using LPOs and JLAs for Safe Work Practices
- More Safe Work Practice audits

Oversight and Supervision

- Contractor HES (CHESM) process with a focus on Short Service Contract Employees

Design & MOC

- Training on MOC process (roles and responsibilities)
- More audits to ensure quality

Incident Investigation

- LPS Quality Reviews to ensure we understand **why** incident occurred (root cause) and that actions address root cause and are sustainable
- Ensuring investigators have time needed to do quality investigations

Learning from Incidents - TOP



The refinery TOP Representatives compile the completed TOP reports each month and produce a monthly summary of the lessons learned as a result of those investigations.

- Please review the latest [TOP Lessons Learned](#) summary



Tank overflow resulting in 2800 barrel spill to secondary containment. Causes included:

- Tank protection systems did not work independently of each other
- Safety instrumented functions were not set up to operate in a fail safe manner
- PLC failure not evident to the operator
- Inadequate overflow & drain system design